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EXAMINER

CANTELMO, GREGG

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 12/02/2002

6

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/867,383

Applicant(s)

KOUYAMA ET AL.

Examiner

Gregg Cantelmo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 1-13 and 21-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 May 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Response to Restriction

1. Applicant's election with traverse of Group II, claims 14-20 in Paper No. 4 is acknowledged. The traversal is on the ground(s) that the two species are not distinct or independent from each other. This is not found persuasive because the original Group I included a dielectric member which is not a structural claim limitation of Group II. In addition Group II recites a gap relationship that prevents plasma from passing through the gap, which is not a structural claim limitation of the apparatus of Group I.

The requirement is still deemed proper and is therefore made FINAL.

2. Newly submitted claims 21-26 directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: the claims incorporate the dielectric member germane to the species of Group I which was not claimed in the original grouping of Group II.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 21-26 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

4. The information disclosure statement filed August 31, 2001 has been placed in the application file and the information referred to therein has been considered as to the merits.
5. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Drawings

6. Figures 10 and 11 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). See page 1 and the Brief Description of the Drawings wherein these figures are disclosed as representations of conventional devices.

Specification

7. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: High frequency sputtering device having a grounding shield arranged at the target circumference.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 14-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10. Claim 14 recites the limitations "the one hand" and "the other hand" in line 14. There is insufficient antecedent basis for this limitation in the claim. These terms do not appear to be representative of features of the claim. There appears to be two gaps one between the metal plate and target and another between the metal plate and cathode (see Fig. 3 for example). Therein the relationship of the metal plate with respect to both the target and cathode defines different gaps. If this is correct then the subsequent recitations of the term "the gap" in lines 14 and 16 are unclear since there would appear to be two gaps. The claim has been interpreted to have two different gaps one between the metal plate and target and the second between the metal plate and cathode. The parameters of the gap set forth thereafter in claim 14 has been applied to all gaps. The

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use of the term "the gap" in claims 18-20 is also indefinite since there are plural gaps present in claim 14.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 14-16 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by the admitted prior art of Fig. 10 and the corresponding disclosure relied upon in the instant application.

Fig. 10 is drawn to a prior art sputtering apparatus comprising: a processing chamber 10, HF power supply 20, cathode 14 in the chamber 10 electrically insulated from the chamber via insulation 12 and connected to the HF power supply 20 the cathode extending only a given axial extent of the processing chamber, a target 22 mounted on the cathode 14, a metal plate 24 mounted in the chamber 10 but in a location outside of the given axial extent of the cathode, the metal plate 24 having an opening in a central portion thereof (wherein lines the cathode and target), wherein the metal plate is electrically grounded to the chamber 10, the metal plate is arranged so as to form a gap between the metal plate on the one hand and the cathode and target on the other, wherein the gap is sufficiently narrow and sufficiently long so as to substantially prevent plasma from passing through the gap (admitted prior art Fig. 10

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and related disclosure in the instant application pertaining to this prior art admission, paragraphs [0003] through [0005] as applied to claim 14).

The metal plate 24 is located in radial alignment with the target 22 (Fig. 10 as applied to claim 15).

The metal plate 24 is located at a side of target 22 (Fig. 10 as applied to claim 16).

The width of the gap is less than or equal to 3 mm (paragraph [0005] as applied to claim 18).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as obvious over the admitted prior art of Fig. 10 and the corresponding disclosure in the instant application in view of JP 09 087 837 A (JP '837).

The teachings of claims 14 and 18 have been discussed above and are incorporated herein.

The difference between the instant claims and the admitted prior art of Fig. 10 and the corresponding disclosure in the instant application is of the depth of the gap being 3mm or greater.

JP '837 discloses a HF sputtering system wherein the earth shield around the target is configured such that it prevents plasma from entering the space between the side of the target and the shield ring (abstract).

In such a configuration, the gap between the target and shield is 0.5-5 mm and the depth of the gap is 1-10 mm (abstract). Note that a significant portion of the gap depth range of JP '837 (3-10 mm) is the same gap depth as recited in the instant claim with 10 mm being a specific data point.

The motivation for providing a gap depth of 3 mm or greater is that it would have provided an arrangement which would have prevented plasma from entering the space between the side of the target and the shield.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of the admitted prior art of Fig. 10 by providing a gap depth of 3 mm or greater since it would have provided an arrangement which would have prevented plasma from entering the space between the side of the target and the shield.

15. Claim 17 is rejected under 35 U.S.C. 103(a) as obvious over the admitted prior art of Fig. 10 and the corresponding disclosure in the instant application in view of JP 57 194 254 (JP '254).

The teachings of claim 14 have been discussed above and are incorporated herein.

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The difference between the instant claim and the admitted prior art of Fig. 10 and the corresponding disclosure in the instant application is that the prior art does not appear to teach of the shield and target being the same material (claim 17).

JP '254 discloses that is advantageous to use a shield member which is of the same material as the sputtering target (abstract).

The motivation for providing a shield and target of the same material is to prevent abnormal discharging (abstract). Furthermore one of ordinary skill in the art would have also recognized the use of a shield member of the same material as the target also reduces the risk of contamination of the film formed on the substrate if a portion of the shield material is sputtered.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of the admitted prior art of Fig. 10 by providing a shield and target of the same material since it would have prevented abnormal discharging and reduced the risk of contaminating the film formed on the substrate.

Claim Rejections - 35 USC § 102

16. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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17. Claims 14-16 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. patent No. 5,167,789 (Latz).

Fig. 1 is drawn to a sputtering apparatus comprising: a processing chamber 25, HF power supply 28, cathode 5 in the chamber 25 electrically insulated from the chamber via insulation and connected to the HF power supply 28 the cathode extending only a given axial extent of the processing chamber, a target 13 mounted on the cathode 5, a metal plate 34 mounted in the chamber 25 but in a location outside of the given axial extent of the cathode, the metal plate 34 having an opening in a central portion thereof (wherein lines the cathode and target), wherein the metal plate is electrically grounded to the chamber 25, the metal plate is arranged so as to form a gap between the metal plate on the one hand and the cathode and target on the other, wherein the gap is sufficiently narrow and sufficiently long so as to substantially prevent plasma from passing through the gap (Fig. 1 as applied to claim 14).

The metal plate 34 is located in radial alignment with the target 13 (Fig. 1 as applied to claim 15).

The metal plate 34 is located at a side of target 13 (Fig. 1 as applied to claim 16).

The length of the gap is 2mm (col. 3, ll. 58-66 as applied to claim 18).

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as obvious over Latz in view of JP '837.

The teachings of Latz with respect to claims 14 and 18 have been discussed above and are incorporated herein.

The difference between the instant claims 19 and 20 and Latz is that Latz does not explicitly disclose of the length of the gap being 3mm or greater.

JP '837 discloses a HF sputtering system wherein the earth shield around the target is configured such that it prevents plasma from entering the space between the side of the target and the shield ring (abstract).

In such a configuration, the gap between the target and shield is 0.5-5 mm and the depth of the gap is 1-10 mm (abstract). Note that a significant portion of the gap depth range of JP '837 (3-10 mm) is the same gap depth as recited in the instant claim with 10 mm being a specific data point.

The motivation for providing a gap depth of 3 mm or greater is that it would have provided an arrangement which would have prevented plasma from entering the space between the side of the target and the shield.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Latz by providing a gap depth of 3 mm or greater since it would have provided an arrangement which would have prevented plasma from entering the space between the side of the target and the shield.

20. Claim 17 is rejected under 35 U.S.C. 103(a) as obvious over Latz in view of JP 57 194 254 (JP '254).

The teachings of Latz with respect to claim 14 have been discussed above and are incorporated herein.

The difference between the instant claim and Latz is that the prior art does not appear to teach of the shield and target being the same material (claim 17).

JP '254 discloses that is advantageous to use a shield member which is of the same material as the sputtering target (abstract).

The motivation for providing a shield and target of the same material is to prevent abnormal discharging (abstract). Furthermore one of ordinary skill in the art would have also recognized the use of a shield member of the same material as the target also reduces the risk of contamination of the film formed on the substrate if a portion of the shield material is sputtered.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Latz by providing a shield and target of the same material since it would have prevented abnormal discharging and reduced the risk of contaminating the film formed on the substrate.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (703) 305-0635. The examiner can normally be reached on Monday through Thursday from 8:00

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a.m. to 5:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan, can be reached on (703) 308-2383. FAX communications should be sent to the appropriate FAX number: (703) 872-9311 for After Final Responses only; (703) 872-9310 for all other responses. FAXES received after 4 p.m. will not be processed until the following business day. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Gregg Cantelmo
Patent Examiner
Art Unit 1745

gc



November 25, 2002